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## A literature-based science program

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## A literature-based science program

### Abstract

The purpose of this paper is to present the value of extending the science program through experiences with the different genres of literature. A review of professional literature will be presented. Then the outcome of working through the process of extending the literature base of a specific unit will be reported.

A Literature-Based Science Program

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by

Susanne DeShaw Reiter

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Elementary science instruction should nurture children's sense of curiosity about the world. Traditionally, science has been taught with a commercially-prepared text as the core of the instruction. This approach to instruction has lacked depth and has failed to encourage children's interest. Educators have recently begun to extend science programs through experiences with the different genres of literature, opening up the world to endless discovery.

#### Purpose of the Paper

The purpose of this paper is to present the value of extending the science program through experiences with the different genres of literature. A review of professional literature will be presented. Then the outcome of working through the process of extending the literature base of a specific unit will be reported.

#### Literature Base for a Science Program

This section will review the professional literature that supports a literature-based science program and will describe the contributions of the specific genres to science instruction. The study of science can be greatly extended through a literature base that includes work from fiction (fantasy, realism, and historical), folk literature, poetry, and nonfiction. Many pieces of literature have a strong background of fact and provide

a unique human perspective on scientific subjects (Huck, Hepler, & Hickman, 1987).

### Value of an Extended Literature Base

Literature can act as a catalyst to link language and science. Literature experiences can break down the barrier between the concepts and processes of science and the reading process by incorporating into the science instructional program the thinking strategies and processes basic to both. Such integration facilitates learning. Some of the common thinking abilities needed in both areas are observing, comparing, measuring, using time-space relationships, predicting outcomes, making judgements, and evaluating (Butzow & Butzow, 1988).

Children are able to understand more easily ideas presented through a narrative style, or a storyline, as found in fiction works than the expository style of textbooks that are closely packed with facts. Children tend to read with much more enthusiasm when interested in a story with accompanying illustrations. They begin reading a narrative style for pleasure without realizing they are learning at the same time (Crook & Lehman, 1990; Stewig & Sebasta, 1989). If a book has pictures and an attractive design, children will become involved while rejecting a book crowded with small type and displaying few pictures. Butzow & Butzow (1988) point out further that literature works can bridge the gap between efferent (reading to

learn) reading and aesthetic (reading for fun). Stewig and Sebasta (1989) state that curiosity is essential if most students are to comprehend a topic in science. Tradebooks, or literature works, can make the difference between a passive and a self-motivated reader/learner.

Teachers who present tradebooks as instructional experiences can choose from a wide range of books, matching the interests and abilities of students with specific literature works. Having a variety of works available increases the chances of children creating their own meaning. The opportunity to make a choice in seeking information is self-motivating. The more questions that are answered, the greater the desire to know (Stewig & Sebasta, 1989).

Students who are exposed to quality literature will frequently read beyond their ability for particular facts. The high interest factor of tradebooks motivates children to explore books considered above their reading level. Quality literature not only supports children's growth in reading and science but their appreciation for good writing as well (Huck et al., 1987).

#### Sources for the Literature Base

Availability of tradebooks for science instruction will vary from school to school. A lack of funds need not deter a teacher from putting together a rich collection of literature. The school media center, public libraries, area education

agencies, parent groups, and private collections are sources for quality literature. Students can also contribute to the collections from their personal libraries. Butzow & Butzow (1989) suggest that children benefit from searching for literature relevant to a curricular topic. Students who possess prior knowledge of a subject can bring their expertise to the project. This search not only will nurture a sense of ownership but will arouse curiosity. Children can come to realize topics can cut across genres. Parents can also become involved in the search for a particular topic.

Professional journals provide lists of literature works that can extend the science study. For example, Science and Children, a professional journal, annually lists recommended tradebooks that cover a wide range of topics.

Smardo and Curry (1982) suggest displaying literature related to a particular science concept in a classroom center to enrich the learning environment. This type of environment enables children to explore at their own pace, ask questions, make predictions, share viewpoints, and develop logical thinking abilities.

#### Problems with Textbooks

Traditionally, science has been taught using textbooks and worksheets. This technique resulted in the subject matter being broken into isolated bits of irrelevant and meaningless



information. According to Butzow and Butzow (1988), children find texts to be dull, uninteresting, and sometimes unreadable. Some science textbooks are described as being poorly written. Garnering information from such works can be a difficult and frustrating task for many students.

Although the textbook remains the dominant tool of instruction, students can have other sources of information in a literature-based program. Tradebooks offer a wider spectrum of information than the typical textbook summary, thus children's vocabulary and conceptual background are extended. Through literature works, children can experience characters, events, and concepts related to science that are lacking in textbooks. Vocabulary need not be restricted for new terms are explained in context (Huck et al., 1987). Also, tradebooks are not affected by the restrictions placed on textbooks by curriculum adoption committees and pressure groups (Stewig & Sebasta, 1989).

#### Value of the Literature Genres

The different types of literature, or genres, offer vehicles for creating meaning in different ways. By offering different genres in a science unit, students can gain a broader perspective of a topic.

Fiction. This type of literature (modern, fantasy, and realism) has an important place in the science classroom. Fiction gives children an extra dimension to consider everyday

occurrences. The strong story line in fiction works enables children to understand and remember a science concept much easier than if it were presented in a textbook. Stories that conform to children's thought processes have much more meaning to them (Butzow & Butzow, 1988).

Folk literature. According to Yolen (1981), myth can offer children explanations for their existence. Children can use folk literature as a tool for interpreting their own day to day experiences. Folklore provides a way of looking at the world from the inside out. Even very young children can absorb the meanings and wisdom of symbolically expressed ancient tales. As a result, children's capacity to wonder is enhanced and their curiosity is encouraged.

The recurring themes in folklore can be a rich resource for teaching of science concepts. For example, American Indian folklore addresses all aspects of nature, including the cycles of the sun, moon, stars, and seasons. West African Anansi myths include the conflicts involved with the concepts of the sun, moon, and darkness on the earth (Hirst & Slavik, 1988).

Environmental study can be enhanced through folklore. For instance, American Indian myths provide fertile ground for teaching positive environmental values. The deep respect American Indians held for all life is evident in their mythology. Hirst and Slavik (1988) relate that American Indian myths depict

how people were in touch with land and nature. Their myths support the belief that all individuals have an obligation for the stewardship of the world. Caduto (1984) relates that American Indians saw themselves as part of nature--not apart from it. These tales allow humans to support and confirm their perceptions of the world and of its creatures. As children listen to folklore, they establish connections between themselves and their surroundings, and can begin to appreciate the elements of nature.

Poetry. In looking at the benefits of extending literature experiences into the science program, poetry can, at first, seem out of place. Its value soon becomes clear if the goal of the science program is to help children become curious and have a sense of wonder about their world. For example, poetry can enhance an awareness of the beauty of nature and the universe. The rhythm of poetry can reinforce the concept of rhythms found in nature, such as weather cycles, seasonal changes, and life styles. It creates opportunities for discussion that reach far beyond the presentation of factual information. The emotional aspect of poetry can foster concern and a sense of caring for nature that will not be gained from a textbook (Glazer & Lamme, 1990).

Poetry heightens emotions and increases one's sensitivity to an idea or mood, though it cannot be a substitute for actual

sensory experiences. For example, children cannot be expected to develop a concept of the texture of tree bark by hearing a poem, but a poet can call up an experience and sensitize children to it, thus extending their understanding. Huck et al. (1987) state that good poetry makes a reader "moan in despair, catch the breath in fear, gasp in awe, smile, or wonder" (p. 405).

Informational books. This genre is another important source of study for the science program. With their colorful design, varied reading levels, and wide-ranging topics, nonfiction works can enhance a science unit. The use of metaphorical language used in tradebooks prevents them from sounding like encyclopedias. Illustrations included in works of nonfiction can help children visualize a concept as well as generalize about it (Huck et al., 1987).

#### Literature-Based Science Unit: Animal Homes

The author of this paper has integrated literature-based language arts into the science program. The example unit is animal homes (habitats) for grade three. The science concepts, initially presented in the school-adopted science textbook, were expanded through literature and related expressive activities. These literature-based activities were presented through centers, both sustaining and specific to the unit.

### Concepts Basic to the Unit

The students were given opportunities to explore these concepts individually and in small groups in sustaining and specific centers.

Each animal's home is right for the animal who uses it.

An animal's home is built where the animal finds safety, food, and shelter for itself and its young.

Animal homes are made from many different materials.

Animal homes come in a variety of sizes and shapes.

Destruction of an animal's home endangers its survival.

### Genres of Literature Presented in the Unit

The concepts and processes encountered in the unit were supported by experiences with many genres of literature: fiction (picture books), folklore, poetry, and nonfiction (see bibliography p. 16).

### Literature Experiences/Sustaining Centers

These centers not only enriched the science study but provided a predictable structure for the learning environment. Their content changed as the units were presented during the school year.

#### Reading/Listening Center

Fiction, folk literature, and nonfiction books supporting the unit concepts were selected for reading independently and for at-home reading. Several selections

were taped and placed with a tape recorder and headphone set for listening enjoyment and to ensure that all students became familiar with the contents regardless of reading level.

#### Fiction and Folk Literature

Aardema, Verna, Who's in Rabbit's House?

Aesop, City Mouse-Country Mouse

Brown, Margaret Wise, Home for a Bunny

Carle, Eric, A House for Hermit Crab

Curran, Eileen, Home for a Dinosaur

Galdone, Paul, The Three Little Pigs

George, William T., Box Turtle at Long Pond

Sachs, Marilyn, Bear's House

Selden, George, Chester Cricket's New Home

#### Nonfiction

Arnold, Caroline, Saving the Peregrine Falcon

Batherman, Muriel, Animals Live Here

Bonnors, Susan, Penguin Year

Case, Denise, The Friendly Prairie Dog

Eugene, Toni, Creatures of the Woods

McCauley, Jane R., Animals that Live in Trees

McClung, Robert M., Animals that Build Their Homes

Nussbaum, Hedda, Animals that Build Amazing Homes

Zim, Herbert Spencer, Birds

### Author/Illustrator Center

The featured author/illustrator of this unit was Robert M. McClung. He has written and illustrated books about wildlife and conservation, chiefly for young children. A number of his books deal with endangered animals and measures being taken to help them. He has won a number of awards and citations including the Eva L. Gordon Award of the American Nature Study Society.

Robert McClung (his own works)

McClung, Robert M., Blaze, the Story of a Striped Skunk

McClung, Robert M., Buzztail, the Story of a Rattlesnake

McClung, Robert M., Shag, the Last of the Plains Buffalo

McClung, Robert M., Whitetail

McClung, Robert M., America's First Elephant

### Poetry Center

Compiled by the teacher, a bound volume of poetry focusing on the theme of animals and their homes was made available for reading. Poems printed on chart paper were also on display in the classroom. The poems for the compilation and the charts were from these volumes primarily.

Fleischman, Paul, Joyful Noise

Ryder, Joanne, Inside Turtles Shells

Yolen, Jane, Bird Watch: A Book of Poetry

#### Bookmaking Center

This center contained directions and materials for constructing books. In these blank books, children could record their responses to the concepts presented in the unit.

#### Interesting Objects Center

This center featured a collection of bird nests, sea shells, bird houses, and a turtle shell. The children examined the objects and observed the diversity of materials and shapes of various animal homes.

#### Centers Specific to the Unit

These learning centers were presented particularly for this unit of study.

#### Mitten Center

Literature Experience

Read/listen to The Mitten, by Jan Brett.

Expressive Activities

Retell the story through pellen pieces.

Retell the story from the illustrations and the borders.



Retell the story with classmates. Use a blanket as the mitten. The characters can crawl under the blanket portraying the animals that crawled into the mitten.

#### Three Little Pigs Center

Literature Experience

Read/listen to The Three Little Pigs: An Old Story, by Margot Zemach.

Expressive Activities

Develop a story map of this story.

Retell the story with classmates using masks.

#### Home for a Bunny Center

Literature Experience

Read/listen to Home for a Bunny, by Margaret Wise Brown.

Expressive Activity

Write a humorous tale about an animal attempting to live in a home that is not right for it.

#### Summary

The instructional practices found in many elementary science programs are in need of improvement. Extending the literature base of the instructional program can enhance the quality of learning and can increase students' interest, curiosity, and involvement. Science concepts can be explored

through the various genres, each genre's unique qualities extending the learning experience.

## References

Professional References

- Butzow, C., & Butzow, J. (1988). Facts from fiction. Science & Children, 25, 27-29.
- Butzow, C. M., & Butzow, J. W. (1989). Science through children's literature. Englewood, CO: Teacher's Idea Press.
- Caduto, M. J. (1984). Nature in native American myths: a program in environmental ethics. Nature Study, 38, 2-5.
- Crook, P., & Lehman, B. (1990). On track with tradebooks. Science & Children, 27, 22-23.
- Glazer, J., & Lamme, L. (1990). Poem picture books and their uses in the classroom. The Reading Teacher, 77, 102-107.
- Harms, J. M., & Lettow, L. J. (1992). Literature and expressive activity. (3rd ed.). Edina, Minnesota: Alpha Editions.
- Harms, J., & Lettow, L. Extending the literature base of the science program through poetry. (Unpublished).
- Hirst, L. A., & Slavik, C. (1988). Using traditional teaching to expand language development and critical thinking. (Unpublished paper presented to Native American Language Issues Institute).
- Huck, C., Hepler, S., & Hickman, J. (1987). Children's literature in the elementary school. (4th ed.). New York: Holt, Rinehart, & Winston, Inc.
- Reinehr, F. (1987). Storyteaching. Teachers & Writing, 18, 2-7.

- Simon, S. (1982). Using children's literature to clarify science concepts in early childhood programs. The Reading Teacher, 36, 267-273.
- Smardo, F. A., & Curry, J. (1982). What research tells us about storyhours and receptive language. Dallas Public Library.
- Stewig, J., & Sebasta, S. (1989). Using literature in the elementary classroom. Urbana, Illinois: National Council of Teachers of English.
- Yolen, J. (1981). Touch magic. New York: Philomel Books.
- Children's Literature
- Aardema, V. (1977). Who's in rabbit's house? New York: Dial/Delacorte.
- Aesop. (1987). City mouse-country mouse and two more tales. New York: Scholastic Book Service.
- Arnold, C. (1990). Saving the peregrine falcon. New York: Carolrhoda/Lerner.
- Batherman, M. (1979). Animals live here. New York: Greenwillow Books.
- Bonnors, S. (1981). Penguin year. New York: Dell Yearling.
- Brett, J. (1989). The mitten. New York: Putnam.
- Brown, M. W. (1956). Home for a bunny. New York: Golden Press.
- Carle, E. (1987). A house for hermit crab. Saxonville, MA: Picture Book Studio.

- Curran, E. (1985). Home for a dinosaur. New York: Troll Associates.
- Eugene, T. (1985). Creatures of the woods. New York: National Geographic.
- Fleischman, P. (1988). Joyful noise. New York: Harper & Row.
- Galdone, P. (1970). The three little pigs. New York: Houghton Mifflin.
- George, W. T. (1989). Box turtle at Long Pond. New York: Greenwillow Books.
- McCauley, J. R. (1986). Animals that live in trees. New York: National Geographic.
- McClung, R. M. (1989). America's first elephant. New York: Morrow.
- McClung, R. M. (1976). Animals that build their homes. New York: Morrow.
- McClung, R. M. (1969). Blaze, the story of a striped skunk. New York: Morrow.
- McClung, R. M. (1958). Buzztail, the story of a rattlesnake. New York: Morrow.
- McClung, R. M. (1960). Shag, the last of the plains buffalo. New York: Morrow.
- McClung, R. M. (1987). Whitetail. New York: Morrow.
- Nussbaum, H. (1979). Animals that build amazing homes. New York: Random House.

- Ryder, J. (1985). Inside turtles shells. New York: Macmillan.
- Sachs, M. (1971). Bear's house. New York: Avon Book Division.
- Selden, G. (1982). Chester Cricket's new home. New York: Dell Yearling.
- Yolen, J. (1990). Bird watch: A book of poetry. New York: Philomel.
- Zemach, M. (1988). The Three Little Pigs: An Old Story. New York: Farrar, Straus, Giroux.
- Zim, H. S. (1956). Birds. New York: Golden Press.